

**PERSONAL**

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**EDUCATION**

<u>School</u>	<u>Date</u>	<u>Major/Minor</u>	<u>Degree</u>
McGill University	1985	Biochemistry	Ph.D.
Luther College, Univ. of Regina	1978	Biochemistry/Chemistry	B.Sc. (Honors)

**ACADEMIC AND PROFESSIONAL HONORS**

1983	Hugh Edmund Burke Medical Research Award
1981	Multiple Sclerosis Society of Canada Postgraduate Scholarship
1980	Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship
1978	Graduated with Distinction
1978	Society of Chemical Industry Merit Award

**PROFESSIONAL RESEARCH AND MANAGEMENT EXPERIENCE**

2008	Global Head, External Research, Novartis Vaccines & Diagnostics.
2007	Site Head US, Vaccines Research, Novartis Vaccines & Diagnostics.
2006	Head, Immunology and Cell Biology, Novartis Vaccines & Diagnostics.
2003	Head, Immunology and Cell Biology, Chiron Vaccines.
2000	Senior Director, Vaccines Research, Chiron Corporation.
1998	Director, Vaccines Research, Chiron Corporation.
1996	Senior Research Fellow, Department of Virus and Cell Biology, Merck Research Laboratories.
1993	Research Fellow, Department of Virus and Cell Biology, Merck Research Laboratories.
1990	Senior Research Biochemist, Department of Cancer Research, Merck Research Laboratories.
1988	Associate Research Scientist, Department of Cell Biology, Yale University School of Medicine.
1985	Postdoctoral Fellow, Preceptor: Dr. George E. Palade, Department of Cell Biology, Yale University School of Medicine.
1980	Doctoral Trainee, Preceptor: Dr. Peter E. Braun, Department of Biochemistry, McGill University.
1978	Assistant in Research, Principal Investigator: Dr. J.R. Gear, Department of Chemistry, University of Regina.

**SOCIETY MEMBERSHIPS**

1990 - present	American Society for Cell Biology
1999 - present	European Society of Clinical Microbiology and Infectious Diseases
2002 - present	Controlled Release Society

**ACADEMIC RESEARCH EXPERIENCE**

My doctoral research involved the biogenesis of myelin, where I specifically studied the post-translational modification of one of the major membrane-associated proteins, myelin basic protein (MBP). Phosphorylation was demonstrated to serve two functions: (i) a role in targeting nascent MBPs to the specific site(s) on the oligodendrocyte plasmalemma where myelin proliferation is being initiated, and (ii) a maintenance function in the intact sheath.

I conducted postdoctoral research with Nobel Laureate Dr. George Palade at Yale University School of Medicine, where I studied translocation of proteins across membranes and intracellular trafficking, which are areas of high current interest in biology. Specifically, I studied the translocation of nascent polypeptides across the endoplasmic reticulum (ER) membrane, their subsequent transport from the ER to the Golgi complex, and the modifications of proteins that take place during this transit. I determined the nature and intracellular locations of glycoprotein glycosylation, fatty acid acylation and phosphorylation, and discovered that trafficking was anomalous with respect to translocation across the ER membrane. In addition, I contributed to the early characterization of the membrane traffic perturbant, brefeldin A, which is now a commonly used tool in biology.

**PREVIOUS INDUSTRIAL RESEARCH EXPERIENCE**

At Merck Research Laboratories, I contributed significantly to three research programs. Initially, I investigated the mitogenicity of the major immunoenhancing protein of *Neisseria meningitidis* and discovered a relationship between pore formation and mitogenicity of this protein. Shortly thereafter, I directed one postdoctoral scientist and one technician in elucidating the intracellular processing events involved in the targeting of exogenous toxin-antigen fusion proteins to intracellular MHC class I molecules. This program resulted in the elucidation of a pathway of antigen presentation involving recycling of cell surface MHC Class I molecules, thereby suggesting a novel means of inducing cytotoxic T lymphocyte responses against viral antigens.

Most of my efforts at Merck were in the DNA vaccine programs, where I conducted seminal proof of concept studies demonstrating induction of CTL responses and protective efficacy in animal models of infection. Subsequently, I directed various aspects of the research that expanded the utility of this approach as a powerful new means of vaccination. For these contributions, I was named one of the key innovators in Merck's influenza DNA vaccine program. I then established the tuberculosis DNA vaccine program where we expanded the applicability of the technology to non-viral infectious disease targets as well. My group was responsible for: i) preclinical studies on influenza, tuberculosis, and HIV DNA vaccines, ii) elucidation of the underlying mechanisms of induction of immune responses by DNA vaccination, iii) development of next generation DNA vaccines through the use of vaccine adjuvants and delivery systems, and iv) development of an influenza DNA vaccine for human clinical evaluation. At Merck Research Laboratories, I directed the research efforts of eight scientists (2 Ph.D., 1 M.D., 1 M.S., 4 B.S.) in the areas of immunology, virology, cell biology and molecular biology. During this time, I was an advisor to the World Health Organization Steering Committee on the Immunology of Mycobacteria.

**RECENT MANAGEMENT RESPONSIBILITIES**

At Novartis Vaccines and Diagnostics, I served as the Site Head for US Vaccines Research, Emeryville, CA reporting to the Global Head of Research. I directed a diverse group of >75 scientists in immunology, cell biology, virology, and molecular biology; working in the areas of viral vaccine discovery and technology development. I also directed a grants and contracts management group responsible for preparation, submission, negotiation and management of external contracts. From 1999 to 2006, my group managed >\$500 million in completed, active and pending awards from government and non-government sources.

I am currently Global Head of External Research based in Cambridge, MA with responsibility for creating new strategies and opportunities for external collaborations in all aspects of the vaccines discovery and development process.

**SCIENTIFIC PUBLICATIONS**

1. Ulmer, J.B. 1978. "The biosynthesis of chelidonic acid". Honours Thesis, Department of Chemistry, University of Regina, Regina, Canada.
2. Ulmer, J.B. and Braun, P.E. 1984. "*In vivo* phosphorylation of myelin basic proteins in developing mouse brain: Evidence that phosphorylation is an early event in myelin formation". **Dev. Neurosci.** 6, 345-355.
3. Ulmer, J.B. 1985. "The phosphorylation of myelin basic proteins and its relevance to myelin biogenesis". Ph.D. Thesis, Department of Biochemistry, McGill University, Montreal, Canada.
4. Ulmer, J.B. and Braun, P.E. 1986. "*In vivo* phosphorylation of myelin basic proteins: Age-related differences in  $^{32}\text{P}$  incorporation". **Dev. Biol.** 117, 493-501.
5. Ulmer, J.B. and Braun, P.E. 1986. "*In vivo* phosphorylation of myelin basic proteins: Single and double isotope incorporation in developmentally-related myelin fractions". **Dev. Biol.** 117, 502-510.
6. Ulmer, J.B., Edwards, A.M., McMorris, F.A. and Braun, P.E. 1987. "Cyclic AMP decreases the phosphorylation state of myelin basic proteins in rat brain cell cultures". **J. Biol. Chem.** 262, 1748-1755.
7. Ulmer, J.B. and Braun, P.E. 1987. "Chloroform markedly stimulates the phosphorylation of myelin basic proteins". **Biochem. Biophys. Res. Commun.** 146, 1084-1088.
8. Ulmer, J.B. 1988. "The phosphorylation of myelin proteins". **Progress in Neurobiology** 31, 241-259.
9. Edwards, A.M., Ross, N.W., Ulmer, J.B. and Braun, P.E. 1989. "Interaction of myelin basic protein and proteolipid protein". **J. Neurosci. Res.** 22, 97-102.
10. Ulmer, J.B. and Palade, G.E. 1989. "Anomalies in the translocation and processing of glycoprotein precursors in murine erythroleukemia cells". **J. Biol. Chem.** 264, 1084-1091.
11. Ulmer, J.B., Dolci, E.D. and Palade, G.E. 1989. "Glycophorin expression in murine erythroleukemia cells". **J. Cell Sci.** 92, 163-171.
12. Ulmer, J.B. and Palade, G.E. 1989. "Targeting and processing of glycoproteins in murine erythroleukemia cells: Use of brefeldin A as a perturbant of intracellular traffic". **Proc. Natl. Acad. Sci. USA** 86, 6992-6996.
13. Schnitzer, J.E., Ulmer, J.B. and Palade, G.E. 1990. "A major endothelial sialoglycoprotein, gp60, is immunologically related to glycoprotein". **Proc. Natl. Acad. Sci. USA** 87, 6843-6847.
14. Ulmer, J.B. and Palade, G.E. 1991. "Effects of brefeldin A on the Golgi complex, endoplasmic reticulum and viral envelope glycoproteins in murine erythroleukemia cells". **Eur. J. Cell Biol.** 54, 38-54.
15. Ulmer, J.B. and Palade, G.E. 1991. "Effects of brefeldin A on the processing of viral envelope glycoproteins in murine erythroleukemia cells". **J. Biol. Chem.** 266, 9173-9179.
16. Schnitzer, J.E., Ulmer, J.B., and Palade, G.E. 1992. "Common peptide epitopes in glycoprotein and the endothelial sialoglycoprotein gp60". **Biochem. Biophys. Res. Commun.** 187, 1158-1165.
17. Ulmer, J.B., Burke, C.J., Shi, C.-Y., Friedman, A., Donnelly, J.J., and Liu, M.A. 1992. "Pore formation and mitogenicity in blood cells by the class 2 protein of *Neisseria meningitidis*". **J. Biol. Chem.** 267, 19266-19271.
18. Ulmer, J.B., Donnelly, J.J., Parker, S.E., Rhodes, G.H., Felgner, P.L., Dwarki, V.J., Gromkowski, S.H., Deck, R.R., DeWitt, C.M., Friedman, A., Hawe, L.A., Leander, K.R.,

- Martinez, D., Perry, H.C., Shiver, J.W., Montgomery, D.L., and Liu, M.A. 1993. "Heterologous protection against influenza by injection of DNA encoding a viral protein". **Science** 259, 1745-1749.
19. Donnelly, J.J., Ulmer, J.B., Hawe, L.A., Friedman, A., Shi, X.-P., Leander, K.R., Shiver, J.W., Oliff, A.I., Martinez, D., Montgomery, D.L., and Liu, M.A. 1993. "Targeted delivery of peptide epitopes to MHC class I by a modified *Pseudomonas* exotoxin". **Proc. Natl. Acad. Sci. USA** 90, 3530-3534.
20. Liu, M.A., Ulmer, J.B., Friedman, A., Martinez, D., DeWitt, C.M., Leander, K.R., Shi, X.-P., Parker, S., Felgner, P., Felgner, J., Montgomery, D.L., and Donnelly, J.J. 1993. "Immunization with DNA encoding a conserved internal viral protein results in protection from morbidity and mortality due to challenge with influenza A in mice". In, **Vaccines** 93, ed., Brown, F., Chanock, R.M., Ginsberg, M.S., Lerner, R.A., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY. pp. 343-346.
21. Deck, R.R., Donnelly, J.D., Hawe, L.A., Friedman, A., Ulmer, J.B., and Liu, M.A. 1993. "Class 2 outer membrane protein from *Neisseria meningitidis* induces immunoglobulin secretion by murine B lymphocytes". In, **Vaccines** 93, ed., Brown, F., Chanock, R.M., Ginsberg, M.S., Lerner, R.A., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY. pp. 359-363.
22. Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1993. "Polynucleotide vaccines". **Curr. Opin. Invest. Drugs** 2, 983-989.
23. Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1993. "Immunization with naked DNA: a sexy technique", reply. **Gastroenterol.** 105, 1252-1253.
24. Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1993. "Naked DNA and vaccine design", reply. **Trends Microbiol.** 1, 324-325.
25. Montgomery, D.L., Shiver, J.W., Leander, K.R., Perry, H.C., Friedman, A., Martinez, D., Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1993. "Heterologous and homologous protection against influenza A by DNA vaccination: Optimization of vectors". **DNA Cell Biol.** 12, 777-783.
26. Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1994. "Presentation of an exogenous antigen by major histocompatibility class I molecules". **Eur. J. Immunol.** 24, 1590-1596.
27. Ulmer, J.B., Deck, R.R., DeWitt, C.M., Friedman, A., Donnelly, J.J., and Liu, M.A. 1994. "Protective immunity by intramuscular injection of low doses of influenza virus DNA vaccines". **Vaccine** 12, 1541-1544.
28. Donnelly, J.J., Ulmer, J.B., and Liu, M.A. 1994. "Immunization with polynucleotides: A novel approach to vaccination". **The Immunologist** 2, 20-26.
29. Montgomery, D., Leander, K.R., Shiver, J.W., Perry, H., Friedman, A., Martinez, D., Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1994. "Nonreplicating DNA vectors designed to generate heterologous and homologous protection against influenza". In, **Vaccines** 94, ed., Brown, F., Chanock, R.M., Ginsberg, M.S., Lerner, R.A., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY. pp. 61-64.
30. Donnelly, J.J., Friedman, A., Montgomery, D., Shiver, J.W., Leander, K.R., Perry, H., Martinez, D., Ulmer, J.B., and Liu, M.A. 1994. "Polynucleotide vaccination against influenza". In, **Vaccines** 94, ed., Brown, F., Chanock, R.M., Ginsberg, M.S., Lerner, R.A., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY. pp. 55-59.

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33. Donnelly, J.J., Ulmer, J.B. and Liu, M.A. 1994. "Immunization with DNA". **J. Immunol. Meth.** 176, 145-152.
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35. Deck, R.R., DeWitt, C.M., Donnelly, J.J., Liu, M.A., and Ulmer, J.B. 1995. "Humoral immune responses to influenza hemagglutinin by DNA vaccination". In, **Vaccines 95**, eds., Brown, F., Chanock, R.M., Ginsberg, M.S., Lerner, R.A., Cold Spring Harbor Laboratory Press (Cold Spring Harbor, NY), pp. 91-94.
36. Donnelly, J.J., Ulmer, J.B., and Liu, M.A. 1995. "Recombinant vaccines: Technology and applications". **Exp. Opin. Ther. Patents** 5, 211-217.
37. Donnelly, J.J., Ulmer, J.B., and Liu, M.A. 1995. "Protective efficacy of intramuscular immunization with naked DNA". **Ann. NY Acad. Sci.** 772, 40-46.
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39. Ulmer, J.B., Deck, R.R., Yawman, A.M., Friedman, A., DeWitt, C.M., Martinez, D., Donnelly, J.D., and Liu, M.A. 1996. "DNA vaccines for bacteria and viruses". **Adv. Exp. Med. Biol.** 397, 49-53.
40. Ulmer, J.B., Montgomery, D.L., Donnelly, J.J., and Liu, M.A. 1996. "DNA vaccines". In, **Methods Molecular Medicine: Vaccine Protocols**, eds., Robinson, A. Farrar, G.H., Wibl, C.N., Humana Press (Totowa, NJ), pp. 289-300.
41. Ulmer, J.B., Donnelly, J.J., Shiver, J.W., and Liu, M.A. 1996. "Prospects for the induction of mucosal immunity by DNA vaccines". In, **Mucosal Vaccines**, eds., Kiyono, H., Ogra, P., McGhee, J., Academic Press, Inc., San Diego, CA pp. 119-127.
42. Shiver, J.W., Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1996. "Naked DNA vaccination". In, **Concepts in Vaccine Design**, ed, Kaufmann, S., Walter DeGruyter & Co., Berlin, pp. 423-436.
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44. Liu, M.A., Caulfield, M.J., Donnelly, J.J., DeWitt, C.M., Deck, R.R., and Ulmer, J.B. 1996. "Mechanisms of protective immunity for an influenza DNA vaccine". In, **Vaccines 96**, eds., Brown, F., Chanock, R.M., Ginsberg, M.S., Lerner, R.A., Cold Spring Harbor Laboratory Press (Cold Spring Harbor, NY.), pp. 79-82.
45. Ulmer, J.B. and Liu, M.A. 1996. "ELI's Coming: Expression library immunization (ELI) as a potential means of vaccine antigen discovery". **Trends Microbiol.** 4, 169-170.
46. Huygen, K., Content, J., Denis, O., Montgomery, D.L., Yawman, A.M., R.R. Deck, DeWitt, C.M., Orme, I.M., Baldwin, D'Souza, C. S., Drowart, A., Lozes, E., Vandenbussche, P.,

- Mooren, J.-P., Liu, M.A., and Ulmer, J.B. 1996. "Immunogenicity and protective efficacy of a tuberculosis DNA vaccine". **Nature Med.** 2, 893-898.
47. Ulmer, J.B., Deck, R.R., DeWitt, C.M., Donnelly, J.J., and Liu, M.A. 1996. "Generation of MHC class I-restricted cytotoxic T lymphocytes by expression of a viral protein in muscle cells: Antigen presentation by non-muscle cells". **Immunol.** 89, 59-67.
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49. Shiver, J.W., Ulmer, J.B., Donnelly, J.J., and Liu, M.A. 1996. "Humoral and cellular immunities elicited by DNA vaccines: Application to the human immunodeficiency virus and influenza". **Adv. Drug Del. Rev.** 21, 19-31.
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## PATENTS

1. Polynucleotide tuberculosis vaccine, US 5,736,524.
2. Polynucleotide tuberculosis vaccine, US 6,384,018.

## INVITED PRESENTATIONS (past 5 years)

IIR Conference on Vaccines Clinical Trials (London, UK), 1/27/03.  
3<sup>rd</sup> Cabo Gene Therapy Focus Panel (Cabo San Lucas, Mexico), 2/15/03.  
World Vaccine Congress (Montreal, Canada), 4/9/03.  
The Future of Vaccines – Cancer Meets Infectious Diseases (Semmering, Austria), 4/12/03.  
Modern Vaccine Adjuvants & Delivery Systems (Dublin, Ireland), 6/6/03.  
HIV Vaccines – Design, Potency & Delivery (Boston, MA), 6/22/03.  
BIO 2003 (Washington, DC), 6/24/03.  
Society for General Microbiology (UMIST, Manchester, UK), 9/10/03.

Tuberculosis Vaccines for the World Conference (Montreal, Canada), 9/19/03.  
6<sup>th</sup> International Forum on Global Vaccinology (Minsk, Belarus), 9/25/03.  
Fundacion Valenciana de Estudios Avanzados "Genetic Intervention in Disease" (Valencia, Spain), 11/27/03.  
The Viability of DNA Vaccines Forum (London, UK), 1/4/04.  
WHO Meeting on Development of Influenza Vaccines (Geneva, Switzerland), 2/27/04.  
Phacilitate Vaccine Forum (Amsterdam, Netherlands), 5/10/04.  
American Society for Gene Therapy (Minneapolis, MN), 6/5/04.  
Controlled Release Society (Honolulu, HI), 6/16/04.  
University of Pennsylvania Center for AIDS Research seminar series (Philadelphia, PA), 9/16/04.  
Emerging Infections and New Vaccinations (Marburg, Germany), 9/28/04.  
Phacilitate Vaccine Forum (Boston, MA), 11/2/04.  
DNA Vaccines (Monte Carlo, Monaco), 11/18/04.  
DNA Vaccines (London, UK), 3/17/05.  
3<sup>rd</sup> International Workshop on DNA Vaccines (Brno, Czech Republic), 5/26/05.  
American Society for Gene Therapy (St. Louis, MO), 6/1/05.  
Infocast Conference on Innate Immunity to Vaccines (San Diego, CA), 6/14/05.  
WHO Consultation on Revision of the WHO Guidelines on DNA Vaccines (Geneva, Switzerland), 7/4/05.  
Innate Immunity in the 21<sup>st</sup> Century (Lansdowne, VA), 9/27/05.  
Vaccine Potency (Bethesda, MD), 10/10/05.  
Vaccines: All Things Considered (Alexandria, VA), 11/3/05.  
Phacilitate Vaccines Forum 2006 (Baltimore, MD), 1/30/06.  
Marcus Evans DNA Vaccine Forum (London, UK), 3/16/06.  
4<sup>th</sup> International Workshop on DNA Vaccines (Trest, Czech Republic), 5/3/06.  
SMI Conference Vaccines: Bench to Bedside (London, UK), 5/22/06.  
CHI Conference on Novel Vaccines: Bridging Research, Development and Production (Cambridge, MA), 8/21/06.  
ICWO Vaccine Conference (Montreal, Canada), 11/9/06.  
Phacilitate Vaccines Forum 2007 (Baltimore, MD), 1/23/07.  
DNA Vaccines (Malaga, Spain), 5/25/07.  
Innate Crossroads, Aegean Conferences (Crete, Greece), 6/18/07.  
CHI Conference on Novel Vaccines (Cambridge, MA), 8/23/07.  
NIH Conference on SARS: Current Progress, Future Directions (Bethesda, MD), 10/1/07.  
Suddath Symposium on Drug Design, Development and Delivery (Atlanta, GA), 3/7/08.  
Marcus Evans Conference on DNA Vaccines (London, UK), 3/10/08.  
Vaccine Technologies II (Albufeira, Portugal), 6/2/08.  
CHI Conference on Novel Vaccines (Cambridge, MA) 8/14/08.  
Strathclyde Institute of Pharmacy and Biomedical Sciences (Glasgow, Scotland), 10/28/08.  
International Society for DNA Vaccines (Las Vegas, NV), 12/10/08.  
Massachusetts Institute of Technology, Department of Chemical Engineering (Cambridge, MA), 3/10/09.

Biotechnology Industry Organization Annual Meeting (Atlanta, GA), 5/20/09.

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